

**Study of Nano nickel plating using pulse
technic**

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Nanotechnology was applied extensively in many engineering parts such as semiconductor manufacturing and magnetic materials. And recently, it's application was extended to surface treatment. Especially, As electrodeposits requirs the excellent surface property at low thickness many study are focused to obtain the nano plating. To obtain the nano grain in electroplating, it needs to increas the potential(increase frequency) and production rate(circulating effect). Our main interest lies in nano nikel electrodeposits which have superior surface property. So, we applied the high frequency pulse and jetting effect of electrolyte to get nano electrodeposits. Also plating efficiency, hydrogen co-deposition and corrosion resistance were also investigated. Nickel was plated onto Cu foil of about 0.12mm thickness from Nikel sulfamate bath at 55. The bath composition was 120g/L and pH was 3.5 4.5. To add jetting effect, the electrolyte was pumped from reservoir to plating cell through small tube. The concentration of Nickel ion was kept constant during plating and confirmed by Ion Chromatography. The Pulse Frequency ranges from 0 (DC) to 100 kHz and wave form was confirmed to accurate square by Oscilloscope. Prior to plating, the substrate was electropolished, cleaned in deionized water twice, activated in 10immediately to the plating solution. Current density was 4ASD. The deposition thickness was 1. The morphology, topology and microstructure of the nickel deposits were investigated by SEM, Scanning Probe Microscope and TEM and XRD, respectively. The corrosion rate of the deposits were studied by A.C impedance and linear polarization methods in 3.5temperature. And other mechanical test was conducted. Some of our results are summerized as follows: (1)Specimen applied jetting was more brighter than does not. (2) XRD

analysis shows that microstructure of high frequency pulse deposits develops into more anisotropic pattern than that of common nickel deposit. (3) Corrosion resistance increased with increase in pulse frequency (4) high frequency pulse and jetting effect cause to fine grain and low surface roughness

Reference

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